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the principal substances which disappeared. In seeking for a catalyzer, iron and manganese were considered. It was found that starch paste with traces of ferrosulfate was completely hydrolyzed in six days at 100°. In a similar experiment without iron salts no hydrolysis took place.

The authors conclude from their work that the fermentation of tobacco is a process of oxidation, in which iron salts may act as catalyzers. They believe that it is almost certain that the processes are of a purely chemical nature, that is, take place without the action of enzymes or bacteria.—H. HASSELBRING.

Ascent of water.—DIXON recounts[18] some experiments intended to show that the living cells of the wood do not influence the rate at which water is transmitted through a stem. Arguing that if there is any sort of action which even facilitates the passage of water upward, its effect would be noticeable experimentally by a downward filtration of water more rapid in a killed stem than in a living one, he arranged two like shoots of syringa so that he could keep the two at the same temperature and could determine the amount of water that would pass downward through them, both being alive, under a given head of pressure in a short time, say 10 minutes. One shoot was then killed, by steam or by poison, with no disturbance, and the amount of water transmitted by both again determined. No appreciable or constant difference was found; whence DIXON argues that vital action is at least unlikely.

On the basis of the strain borne by the water of a soap-bubble film, DIXON calculates that the tensile strength of water, even when saturated with air, is not less than 42.5 *A*, a figure which agrees fairly well with BERTHELOT'S early determination, 50 *A*, to which he calls attention. In another paper,[19] DIXON presents some further experimental work on this point. He finds a tensile strength under certain conditions of more than 150 *A*. There is no longer doubt that the cohesion of water is sufficient to stand the strain involved in a lift; but what are the resistances to be overcome? EWART says about 50 *A*; DIXON thinks this too high, and suggests a maximum of 20 *A* for the tallest trees (100^{m}). In the absence of determinations of the osmotic pressure in the leaves of such trees, DIXON thinks it fair to assume that it is as much as 20 *A*. Others will deny the assumption. And, as Mr. Dooley pointedly says, "There y' are!"—C. R. B.

Life of pollen.—PFUNDT,[20] working under the guidance of PFEFFER, has determined the viability of pollen in air of various degrees of humidity. Incidentally he presents many data regarding the germination of pollen that will be useful.

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[18] DIXON, H. H., Vitality and the transmission of water through the stems of plants. Notes from the Botany School of Trinity College **2**:5–18. 1909.

[19] ———, Note on the tensile strength of water. *Ibid.* 38–43. Both "Reprinted from Proc. Roy. Dublin Soc.," without citation of volume or pages.

[20] PFUNDT, MAX, Der Einfluss der Luftfeuchtigkeit auf die Lebensdauer der Blüthenstaubes. Jahrb. Wiss. Bot. **47**:1–40. 1909.

It is found that the duration of life depends directly upon the humidity of the air, being greatest at one vapor pressure and least at another; but these points do not coincide for all kinds of pollen. There are only a few species which live longest in very moist air (90–60 per cent.), and only one that lives the same length of time in moist as in dry air; but there are many species which live longest in very dry air (30–0 per cent.). (A priori, it would seem that all pollen should remain alive longest in absolutely dry air, and one wonders whether the differences found by PFUNDT are not due to some other factors, for whose operation there is ample room in the handling of the material, and particularly in the artificial germination tests on which the conclusions are based.) In nature the duration of life is very variable because of the variations in the moisture of the air. The influence of a single change from moist to dry is not very evident, but repeated changes shorten life, and the drying of wet pollen leads quickly to death, the sooner the longer it was wet. Ecological adaptations are not clear; the pollen of early spring and late autumn flowers, however, is generally long-lived, shows little sensitiveness to moisture, and germinates at minimum temperatures, even below 4–5°. Whereas freshly gathered pollen may germinate in dilute or in concentrated solutions indifferently, that which is about to die produces tubes only in the most favorable concentration.—C. R. B.

Morphology of Salvinia.—ARNOLDI[21] has published the results of a study of *Salvinia natans*. The paper is divided into three parts: (1) the germination of the microspore and the development of the male gametophyte; (2) the germination of the megaspore and the development of the female gametophyte, fertilization, and embryo formation; (3) a series of experiments on the female gametophyte. In the first part little is added to BELAJEFF'S account except such cytological details as the size of nuclei and chromosomes, the number of chromosomes (4), and the spermatogenesis. The early stages of the female gametophyte were followed more closely than by previous authors. It is found to be composed of a coenocytic portion contained within the old spore wall, and an exposed chlorophyll-bearing tissue, one side of which bears archegonia. In the mature archegonium, the axial row consists of the egg, the ventral canal cell, and a broad wedge-shaped neck canal cell which is binucleate. In the third part of the paper the following facts are recorded: (1) an unsuccessful attempt to produce apogamous embryos: (2) the appearance of the archegonia in the upper or lighter side of the prothallium is not a response to light; (3) the development of the winglike appendages, characteristic of the female gametophyte of Salvinia, occur only when fertilization and embryo formation precede it; (4) the food material used by the developing embryos is not made by the chlorophyllose tissue of the gametophyte, but is that which was stored in the megaspore; (5) spores sown on damp clay germinated and produced good prothallia with normal archegonia and embryos.—WANDA M. PFEIFFER.

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[21] ARNOLDI, W., Beiträge zur Morphologie der Keimung von *Salvinia natans*. Flora **100**:121–139. *figs. 47.* 1909.